

ORIGINAL ARTICLES

TREATMENT OF CHRONIC GASTRIC ULCER.*

By George E. EBRIGHT, M. D., San Francisco.

The chief purpose of this paper is the consideration of the treatment of those rather common cases of simple gastric ulcer which are of considerable duration and which show a lack of tendency to heal and a marked tendency to recur, which are usually of not such severity as to confine the patient, but which do interfere more or less with his general health—a class of cases to which the term ambulatory might be applied. A very brief consideration of the chief subjective and objective effects of this lesion will more clearly define the scope of the measures that will be advocated for its treatment.

Associated with most gastric ulcers is a state of deficient general nutrition. This is manifested by a very constant presence of anemia and a loss of body weight. A discussion of the cause of the ulcer is out of place here, as well as the question as to whether the deficient nutrition causes the ulcer, or the ulcer causes deficient nutrition. The blood picture is usually that of a chlorosis of varying degree. It is very usual to find only a moderate hemoglobin deficiency, such as 65 per cent to 75 per cent, while the red blood cells maintain an approximate normal: that is, a color index of from 0.60 to 0.81. In my experience, often more striking than the blood picture, is a loss of weight that the patient suffers. For instance, a girl of 23 whose weight was 117 had lost 24 pounds, another whose normal weight was 147 had lost 20 pounds, another a woman of medium build had lost 25 pounds.

The stomach, of course, partakes of the general lowered resistance, and when the ulcer is once established, the deficient metabolic processes are of the greatest obstacles to its healing, just as, for instance, the surgical wound will heal more kindly and promptly in a strong, healthy person than in one of low vitality. Daettweiler demonstrated that an ulcer which he caused in a healthy dog's stomach healed in 18 days, while an ulcer of similar size in the stomach of a dog that had been rendered anemic was not healed in 31 days. In 60 per cent of chronic gastric ulcers, hyperacidity exists. Hyperacidity, as shown by Matthes, is not the cause of ulcer unless an erosion exists. In his experiments on dogs 0.56 per cent HCl flowing over the gastric mucous membranes did not produce ulceration, but if ulceration was already present it prevented its healing and caused it to become chronic. Treatment therefore

necessarily has first to deal with removing hyperacidity and at the same time so improving the patient's general condition that he generates within himself adequate reconstructive powers.

Pain is not only a distressing symptom, but it is an important element in causing loss of weight, in that it prevents the patient from taking proper nourishment and also interferes with his sleep. For example, in Case 2, during an attack she ate and slept very little and lost ten pounds in five days.

Case 1. A. H., a clerk, 24 years old, who had had intermittent pain in his stomach since childhood and at the time of examination gave him considerable trouble about an hour or more after eating. Examination showed this pain to be limited to a point $2\frac{1}{2}$ inches below the ensiform process, which was constantly tender on pressure. A peculiar circumstance was that he could cause this pain by lying on his back for about an hour and could immediately relieve it by lying on his stomach. There was a tender Head's area just to the left of the spine between 10th and 12th ribs. He appeared under-nourished, although he claimed to have lost no weight. His hemoglobin was 83%, red blood cells 4,760,000, color index 0.87. Leukocytic formula was normal. Analysis of the gastric contents one hour after Ewald breakfast showed:

Total acidity	0.457%
Free hydrochloric acid.....	0.292%
Combined hydrochloric acid.....	0.164%
Total hydrochloric acid secreted.....	0.456%

The gastric motility was normal. There was no dilatation, X-ray photograph after bismuth meal showed normal shape and position of the stomach.

This man was allowed to attend to his usual duties, at first was allowed tentatively to continue with his usual general diet and was given 30 grain doses of bismuth salicylate before meals. This had no effect upon his pain by the end of ten days. He was then placed upon a strict milk diet and the bismuth discontinued. Amelioration of symptoms began at once, but the milk had no effect in reducing quantity of acid, as is seen by the following analyses which were made with the following object. Having previously noticed the benefit from milk and that the patient also did well with raw eggs, it occurred to me to first see to what extent the character of the gastric secretion changed since milk diet was instituted. Next, whether, after several days of milk diet, the secretion had undergone modification after having been in the habit of having milk diet alone. Similarly to ascertain the effect of raw eggs, not only when they were first used, but also after a lapse of a number of days. The results were as follows. On the morning of the first day of milk diet, 500 c.c. of milk were given and withdrawn with a stomach tube at the end of an hour. This showed:

Total acidity	0.41%
Free hydrochloric acid.....	0.20%
Combined hydrochloric acid.....	0.197%
Organic acid and acid salts (chiefly lactic acid)	0.018%

At the end of three days on milk this was repeated with the following result:

Total acidity	0.210%
Free hydrochloric acid.....	0.266%
Combined hydrochloric acid.....	0.167%
Total hydrochloric acid.....	0.433%
Organic acid and acid salts.....	0.034%

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The following day he was given a test breakfast of 500 c.c. of milk in which were mixed two raw eggs. This was withdrawn in an hour and showed that the acidity had dropped to less than half what it had been the day before, as follows:

Total acidity	0.2098%
Free hydrochloric acid.....	0.025%
Combined hydrochloric acid.....	0.117%
Organic acid and acid salts.....	0.067%

The patient was then directed to take two quarts of milk a day with four to six raw eggs, and at the end of five days the milk and egg test breakfast was again given. Withdrawn at the end of an hour showed:

Total acidity	0.219%
Free hydrochloric acid.....	0.058%
Combined hydrochloric acid.....	0.058%
Organic acid and acid salts.....	0.102%

It is not only noticed that the addition of the eggs caused a diminution of the total hydrochloric acid, but also, as would be expected, the combined hydrochloric acid was much in excess of the free hydrochloric acid, while the contrary was the case with milk alone. No drugs were given except cathartics as they were required. About the end of three weeks after beginning milk treatment and during which time meat, rice, etc., had been added, all evidences of ulcer had disappeared, i. e., the patient suffered no pain whatever and upon examination no tenderness could be elicited. At this time was given a pill containing carbonate of iron and strychnin.

Case 2. Mrs. X, age 30, who had very severe gastric pains for the preceding year, which began, as a rule, three or four hours after eating and which would continue from a day to several days at a time. They could be caused at any time by certain indigestible foods. She was 30 pounds below her normal weight, which was 168. Color index of blood was 0.75. February 18, 1910, she had an acute exacerbation which had lasted four days. Pain was sharply localized in epigastrium, constant in position. She was put on diet of a quart of milk and six to twelve raw eggs per day with 30 grains of salicylate of bismuth, 5 grains bicarbonate of soda before meals. Patient remained on her feet and improvement began promptly. The diet was increased in a few days by allowing at first rice, potatoes and white meat. In the following six weeks the patient gained 15 pounds and she was free of symptoms and her condition was better than it had been for a year.

Case 3. Miss Y., a woman of 29, had had irritable stomach for many years. Was unable to eat any food except a little rice, was hungry but apt to be miserable with pain when she ate; so she ate very little and infrequently. Had fallen from 147 pounds to 128. Physical examination showed pain to be in epigastrium, which showed sharply localized tenderness. Color index 0.75. This patient could not take milk and was given a diet of raw eggs together with bismuth and soda. The diet later was increased by addition of starches which were well tolerated, and the patient was given iron and Fowler's solution alternately. Her progress was gradual, but on the whole satisfactory. By the end of six weeks she was considered well. At the expiration of three months was within a few pounds of her normal weight, having gained ten pounds.

Case 4. Miss Z., a stenographer, 23 years old, complained of having had stomach trouble for years, especially in the preceding few weeks. She had heartburn and acid eructations. She weighed 93 pounds, having lost 24. She was unable to eat without pain of a violent character in the abdomen. Physical examination of the patient showed tender spot the size of a dime in the upper part of the epigastrium. Examination was otherwise negative. Patient was put on milk diet with 30 grain doses of bismuth before eating. She was allowed to continue her work. In a month was well and had gained 4 pounds. She found, however, that fruit caused distress and that

it was difficult for her to get along without bismuth. During the next five months her health was, on the whole, greatly improved, but she had a couple of short relapses which necessitated dietary restrictions.

Case 5. Miss K., 33 years old, presented herself October 6, 1908. Patient had been an invalid with stomach trouble since childhood. She had been anemic for a long time. Easily out of breath and complained of a pain like the toothache in the lower part of the sternum above the ensiform. She was very constipated, had hematemesis several years before in a similar attack. She had a mitral valvulitis traceable to articular rheumatism some years past. The patient was in distress after eating, though sometimes not for an hour or so. Acid foods gave the most trouble. There was deep induration in the epigastrium, apparently of the stomach, and this was quite painful on pressure. Patient improved steadily on a quart of milk a day and three raw eggs, and within a few weeks was eating a very general diet. After a lapse of a year and a half has had no recurrence and has enjoyed better health than at any time in the preceding 25 years.

It is seen that these cases are all chronic and of a comparatively mild type. There was no hemorrhage in any of them and history of hemorrhage in only one. The symptoms of all were ameliorated by milk diet, sometimes with the addition of bismuth and soda. They all had more distress after taking acid food, such as fruit. It was noticed in several instances that even after recovery it was some time before the patient could, with impunity, take irritating food. For instance, although Case 5 has had no indications of trouble for a long time, she knows that she can cause pain by taking apple sauce. Case 2 can bring on pain by eating nuts.

In Case 1 the paradox of the proteid food, i. e., eggs, causing diminution of the hydrochloric acid secretion, is only apparent. According to Starling (E. H. Starling, University College, London, Recent Advances of Physiology of Digestion) there is a marked difference of activity in the two portions of the stomach, the larger part acts as a reservoir which contains the mass of the food and slowly contracts upon it, propelling the fluid portions toward the pyloric end. The presence of milk in the cardiac end of the stomach excites the reflex nervous mechanism, bringing about secretion of a small amount of gastric juice; this in turn passes over the epithelial cells in the pyloric region, stimulating them to the formation of gastric secretin or hormone, which circulating in the blood stimulates the peptic glands and causes outpouring into the stomach of by far the greater amount of the hydrochloric acid present during the digestion of that meal. Now, when raw eggs are taken in addition to the milk, the egg albumen unites with the free hydrochloric acid, forming loosely combined hydrochloric acid. Combined hydrochloric acid does not stimulate the pyloric cells to form gastric hormone, hence the fall of hydrochloric acid from 0.4 per cent to 0.14 per cent.

Milk diet will, as a rule, relieve the pain. Of drugs there is not a great deal to be said. Bismuth is of decided value in relief of pain, given in doses of 30 grains of the subnitrate, salicylate, subgallate, or oxychlorid. It is well to combine it with small amount of bicarbonate of soda. One might hesitate to use the subnitrate in cases of gastric dilatation with retained fermenting contents. Silver nitrate

causes an increase of hydrochloric acid and its clinical benefits are so questionable that it has no logical position in the treatment of this disease. Although experiments show that belladonna inhibits gastric secretion, it has not been demonstrated to be a satisfactory drug in this connection. Very important adjuncts, however, are the drugs with tonic action, and after acute symptoms are past exacerbation of the usual doses of arsenic, iron, quinin and strychnin are to be exhibited.

In more severe cases of gastric ulcer the verdict of statistics favors the treatment instituted by Lenhartz (*Lancet* of July, 1906). He treats such patients with rest in bed for at least two weeks with ice on the abdomen and begins, during the first 24 hours, even after bleeding, with 200 c.c. to 300 c.c. of iced milk and 2 to 4 beaten eggs. The milk is increased daily by 100 c.c. and one additional egg is given each day until the maximum of one quart of milk and 6 to 8 eggs a day has been reached. He then adds meat, etc. This regimen has been tried for some six years in Hamburg at the Eppendorfer Krankenhaus with a recurrence in 20 per cent.

Perforation, of course, demands immediate surgical treatment, the mortality of unoperated cases being 95 per cent. It is important, furthermore, to resort to surgical treatment with all possible dispatch, as the mortality in cases operated within 12 hours is only 25 per cent, while the mortality of those operated from 12 to 24 hours after the perforation is 65 per cent. Treatment of hemorrhage is to be divided according to the nature of the hemorrhage. Single large hemorrhages are best treated by rest and Lenhartz diet. It is generally admitted that bleeding is rarely directly fatal, but that recurrent hemorrhages are dangerous (Hale White). The difficulty of reaching the bleeding vessel is great and operation has a high mortality. The danger of causing perforation by feeding after the hemorrhage is negligible. Moyahan gives 21 cases of perforation and in none of them was there recent hemorrhage.

The question of surgical treatment arises in those cases where, after medical treatment has been tried for a reasonable time, the patient is not better or is worse. Patterson recommends that if, after six weeks' complete rest on a milk diet, followed by a three-months' careful diet, the patient is not free from clear and definite symptoms, or if he has a relapse, operation is indicated. Leube says four or five weeks should be sufficient to see whether medical treatment will suffice. Mayo Robson advises a fair trial for medical treatment in acute and chronic cases but adduces glowing statistics in favor of surgical interference. Sir Dyce Duckworth (*Brit. Med. Jour.*, December, 1906), points out the undesirability of operating for gastric hemorrhage in young women.

In summarizing, it may be said that the satisfactory treatment of simple, chronic ulcer of the stomach is a diet consisting for a few days entirely of one to two quarts of milk with, as soon as possible, from two to twelve raw eggs. The patient may be allowed to follow his customary routine of living. Large doses of bismuth are of value in con-

trolling pain. The patient must at all times be on such diet as will improve, first of all his general state of nutrition, in other words forced feeding within the capacity limits of the stomach. Inasmuch as rectal feeding, which has been advised that the stomach may be put at rest, does not cause complete arrest of peristalsis and since it is known that retrograde peristalsis may be set up by it and the food given by rectum actually found in the stomach and since, at the best, rectal feeding is starvation diet, and particularly in view of the brilliant statistics of Lenhartz, it would certainly appear that starvation and rectal alimentation are illogical procedures in the treatment of chronic gastric ulcer.

Discussion.

Dr. H. D'Arcy Power, San Francisco: Any rational discussion of gastric ulcer must take into consideration the fundamental and determining causes of the condition, especially the latter. It is to be remembered that gastric ulcer is one of the commonest of diseases—autopsy statistics showing its presence in from 6 to 20 per cent. of all post mortems, therefore its relation to other common conditions is as likely to be coincident as causative. But whether we attribute its presence to anemia, vascular perversions, hyperchlorhydria or lack of antiproteinase, we are equally confronted with the fact that it is almost confined to the region of the pylorus and antrum—that is where attrition and acid concentration are at the maximum. As I see it these facts supply the principal therapeutic indications. We must reduce acidity and avoid mechanical irritation. Reduction of acidity can be brought about by diminishing the secretion or neutralizing the product. It is at this point that I am unable to accept the theory, or concur in the practice of the Lenhartz treatment insofar as it prescribes an excessive egg diet. Undoubtedly this will reduce the free acid by combination, but the product of that combination is, as I understand it, a direct stimulant to the gastric hormone, and further hydrochloric acid production. This is only in accord with physiologic law, and the observations of Pavlov that the production of the digestive solvents is proportionate to the work they are called on to do. The administration of excess of proteids relieves the immediate condition, but provokes its reproduction. I prefer to neutralize excessive acidity with magnesium oxide, which I believe inhibits rather than excites the formation of gastric secretion. Further I believe the free exhibition of strontium bromide tends directly to control the neurosis of which the hyperchlorhydria is a part. The second indication is to avoid attrition of the ulcerated surface. The food must not only be soft, but devoid of residues after digestion has removed the major part. This is a reason why meat in a general way is contraindicated as the peptonization of the fibrous matrix is rarely complete in the stomach. The use of fat has been recommended, but it retards the emptying of the stomach, and this I hold to be undesirable. When pain and excessive mobility are present, I believe that small doses of morphia 0.003 to 0.005 grm. are decidedly beneficial. Bismuth subnitrate in 4 gram doses given at night when the stomach is empty is both rational and useful. With the rest of the Lenhartz treatment as practiced by Dr. Ebright I am in entire accord. It is a close approximation to that followed in English medical practice for the last twenty-five years and has served well.

Dr. W. A. Clark, San Leandro: It seems to me that this paper is very timely, following upon the heels of the surgical section. Those of us who are doing stomach surgery do not need to think that every patient complaining of pain in the stomach needs operation, as 80 per cent. of gastric ulcer cases are cured by medical treatment. At the same time the 20 per cent. left belong specifically to the surgeon. Dr. Ebright purposely takes up the medical

end of this question only. The medical man should not forget the danger of carcinoma in these cases, which frequently comes long before we think it does.

Dr. G. E. Ebright, San Francisco: With regard to the time when we should turn these cases over to the surgeon, most authorities agree that four or five weeks is about the limit within which the medical treatment should be tested. At that time if there is no improvement, it becomes a question as to whether surgical interference should be instituted, and it seems to me that we as internists, should then call for the opinion of the surgeon. These cases are border line cases. Sometimes it is better to adhere to medical treatment for a longer time and sometimes it is definitely imperative to operate early. The question as to treatment will depend largely upon the patient's nutrition and if we can build that up, we can do a great deal toward improving the condition of the ulcer. If we cannot, particularly if there is a stenosis associated with the ulcer, the quicker the case goes to the surgeon the better. On the other hand, we have no guarantee that if the same condition obtain which caused the ulcer, we may not have a recurrence even after operation.

A CASE OF TWITCHING OF THE ORBICULARIS PALPEBRARUM SUCCESSFULLY TREATED WITH CALCIUM CHLORID.*

By THEO. C. BURNETT, M. D., Berkeley.

The twitching of the orbicularis muscle, generally described in text-books under the head of blepharospasm, is not a very uncommon affection; and yet I think I am not far wrong in saying that no one man comes in contact with a sufficient number of cases to furnish a series that would be satisfactory as statistics. As the value of a therapeutic measure depends upon the number of cases successfully treated, in such cases it becomes necessary for each individual to publish his results, that they may become available for the use of others. It is with this view that the following case is published, as well as to call the attention of ophthalmologists to a method of treatment that I think is not generally familiar.

Miss G., a student in the University of California, consulted me at the Students' Infirmary in October last (1909) for a persistent twitching of the lower eyelid on the left side which had lasted for months. She complained of it as being very annoying. On inspection a rythmical twitching of the lower segment of the orbicularis was plainly visible. She was examined very carefully for some error of refraction, but none was discovered. There was an exophoria of one diopter on the first examination, but it is probable that the phorometer was not level, as an examination a day or two later failed to reveal even this. She was put upon 0.3 gm. of calcium chlorid three times daily. She took the remedy for something like two weeks, and then was obliged to stop on account of its bad taste and irritant action. At this time she was decidedly better, but there was still some twitching. An effort was made by the writer to find some means for giving the salt in a more pleasant form, and meanwhile she was instructed to do nothing but wait. The improvement went on slowly, however, and the twitching ceased a few days afterward. There has been no return at the time of this writing

(March, 1910), notwithstanding she has been through the severe strain of the mid-term examinations at the University. The continued improvement after she had ceased taking the calcium is accounted for by the fact that the salt is slowly absorbed and slowly excreted; its action is therefore probably cumulative, and lasted for some time after its administration had been stopped.

In 1881, Biedermann¹ described a rythmical twitching of the sartorius muscle of the frog when it was put in solutions of various salts. He described it as due to chemical stimulation. Later Loeb² repeated these experiments with the view of ascertaining, if possible, which ion was the cause of the stimulation. He also found it was possible to inhibit these contractions by adding a little calcium chlorid to the given solution, and suggested that our muscles do not contract rythmically because of the presence of the proper amount of calcium. Following this came the development of his theory of balanced solutions and ion-proteid compounds.

During the past year considerable work has been done on this subject from the clinical point of view. Stone³ has reported a case of tetany successfully treated by calcium salts. McCallum and Voigtlin⁴ have shown that the tetany following the removal of the parathyroids is prevented or relieved by the administration of calcium. They also show the parathyroids to have some influence on calcium metabolism. Cooke⁵ throws some doubt upon the constancy of the findings of McCallum and Voigtlin, but still suggests there is an altered salt equilibrium in tetany. F. P. Kinnicut⁶ has also recently published "A Clinical Study of the Therapeutic Value of the Calcium Salts in Gastric Tetany." Finally, Winternitz⁷ concludes that calcium salts should be used therapeutically in tetany complicating tuberculosis. It is possible that some one has preceded me in applying these facts to blepharospasm, but I am not aware of it, for the reason that our means of reference in this particular are somewhat limited.

In view of the above facts, it seemed to the writer a perfectly natural procedure to administer calcium in Miss G's case, and the results justified it. In all the cases cited above, calcium was used in the form of the lactate, this salt being far less disagreeable than the chlorid. Theoretically the lactate ions should not enter into the combination, as the lactate of calcium is only sparingly soluble and slightly dissociable. As a matter of fact, however, the lactate is so readily oxidized that its effect in throwing the calcium out of commission is probably rendered nil by this means. It is unfortunate that the chlorid is so disagreeable, for it is the ideal salt to administer for these spasmodic affections; but if the lactate is found in practice to answer the purpose, there can certainly be no objection to its use. Miss G. willingly lent herself to experimentation and co-operated throughout, so that there was no difficulty in administering the chlorid until it began to interfere with her digestion.

The writer is well aware that "one swallow does not make a summer" and that one case is very little proof; in fact, these cases are known to recover spontaneously. Others can take up the subject who

* From the Students' Infirmary of the University of California.